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EXAMINER	
LEGESSE, HENOK D	
ART UNIT	**PAPER NUMBER**
2861	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

T14

Office Action Summary	Application No.	Applicant(s)	
	10/576,338	BICH ET AL.	
	Examiner	Art Unit	
	Henok Legesse	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *1-10 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11 and 13-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *one Foreign reference (JP)*.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 11, and 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piatt et al (US 4,748,460) in view of Kokubo Masatoshi (Japan Pub. # 10-006566) and Taneya et al (US 6,286,927).

Regarding claim 11, Piatt et al teaches a liquid jet head (elements in fig.1and 2 including 12, 16, 28, 30, 32, and 33) comprising:

a substrate (38, fig.3) adapted to be mounted on a liquid ejecting instrument (14 and 19 of fig.1);

a liquid jet system (32, 34, 36, 40, and 42, fig.3) positioned on the substrate (38), said liquid jet system (32, 34, 36, 40, and 42) being adapted to eject liquid onto a medium from a distance (col.2, lines 10-33);

a control unit (16, fig.1), coupled to said liquid jet system (control unit 16, fig.1, is connected to the resistive heater element 32 of the liquid jet system in fig.3 via flexible circuit 33,fig.1, and contact pads 32, fig.2), to activate said liquid jet system for ejecting liquid onto the medium (col.2- col.3); and

Piatt et al fails to teach a measurement means for acting, without physical contact with the medium, to measure the distance between the liquid jet head and the medium, said measurement means being coupled to said control unit, wherein said measurement means is positioned on the substrate; and wherein said control unit is positioned on said substrate.

However, from the same endeavor: Kokubo Masatoshi teaches a measurement means (6, fig.1) for acting, without physical contact with the medium (15), to measure the distance between the liquid jet head (2) and the medium (15), said measurement means (6) being coupled to said control unit (CPU), wherein said measurement means (6) is positioned on a substrate (4);

Taneya et al teaches a liquid jet head (figs.1, 2, 6, 7) that includes measurement means (9, 10) and control unit (CPU 26, fig.3) positioned on the same substrate (1) by using semiconductor layer at the same time during semiconductor processing (col.6, lines 24-55; col.15, lines 36-42).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the measurement means of Kokubo Masatoshi and the control unit of Taneya et al on the substrate of Piatt et al based on the teachings of Kokubo Masatoshi and Taneya et al. The motivation being to provide a printer that prints only when the print head is at a predetermined distance from the medium for optimum print quality , to provide a printer that can print on a rough and irregular surfaces where printing with out contact is essential (see abstract of Kokubo Masatoshi), and to reduce manufacturing cost by forming the control unit and the measurement means at the same time during semiconductor processing and to improve control and accuracy of the device (col.6, lines 24-55; col.15, lines 36-42 of Taneya et al).

Regarding claims 13 and 14, Kokubo Masatoshi further teaches said measurement means (6, fig.1) further comprises an optical system (an ultrasonic acoustic probe serving) to measure the distance between said liquid jet head (2) and the medium (15) (see paragraph 0034).

Regarding claim 15, Piatt et al further teaches said substrate (38, fig.3) further comprises a supply channel which extends between an inlet port designed to be connected to a liquid tank (12, fig.1 and 2) housed within the liquid ejecting instrument (14 and 19,fig.1), and an outlet port connected to said liquid jet system (fig.3) (see col.2

lines 49-57; channels in substrate 38, not shown in the figures, provides a path for the ink to flow from ink bladder 26 to the ink chamber 40).

Regarding claim 16, Taneya et al further teaches a substrate (1, fig.1) which is made of a material from a group consisting essentially of glass, silicon, ceramic and polymer materials (substrate 1 in fig.1 is made of semiconductor layer. Note that semiconductor materials are well known to be made of essentially of silicon materials. Glass is made of essentially of silicon materials). Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a substrate which is made of essentially of glass, silicon, ceramic and polymer materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for intended use for the reason that silicon or glass are less conductors of heat than for example metal, this property allows to concentrate the heat produced by heating element (such as 32 fig.3 of Piatt et al) in the ink chamber i.e. less loss of heat due to conduction of heat by the substrate resulting effective ink ejection at a lower driving current from the power source. In re Leshin, 125 USPQ 416.

Regarding claim 17, Piatt et al further teaches said liquid jet system (elements in fig.3 formed on top of 38) further comprises a thermal liquid jet system adapted for ejecting liquid droplets from at least one orifice (orifice on orifice plate 42 in fig.3) (the

liquid jet system in fig.3 is itself a thermal liquid jet system, see the abstract and col.2, lines 52-57).

Regarding claim 18, Piatt et al further teaches said substrate (38, fig.3) is formed by a plate having a first side (the top side of 38 in fig.3 where elements 34 and 32 are attached on) designed to face the medium and a second side (the bottom side of 38) opposite to the first side, and wherein said thermal liquid jet system (elements on top of substrate 38) comprises:

at least one resistive heater (32) element positioned on the first side of said substrate (38), and

a block (36) mounted on the first side of the substrate (38), said block (36) having at least one liquid channel having an inlet chamber (col.2, lines 49-52) and an outlet orifice (orifice formed on 42) facing said at least one resistive heater element (32) for ejecting ink droplets onto the medium (col.2, lines 43-57).

Regarding claim 19, Piatt et al as modified by Kokubo Masatoshi and Taneya et al further teaches a movement detector means (fig.3 of Kokubo Masatoshi) positioned on said substrate (38, fig.3 of Piatt et al), said movement detector means (fig.3 of Kokubo Masatoshi) being adapted to detect movement of the liquid jet head (fig.1 of Piatt et al), said movement detector means (fig.3 of Kokubo Masatoshi) being coupled to said control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) (see the abstract, fig.1-3 and the corresponding texts of Kokubo Masatoshi).

Regarding claim 20, Piatt et al further teaches a liquid ejecting instrument (14 and 19 of fig.1) comprising a substantially tubular element (see fig.1) extending between a first end (the end near to element 10) and a second end (the end near to element 24) and designed to be hand-held by a user (see fig.1), said tubular element (fig.1) comprising:

a liquid tank (12);

an electrical power source (18); and

a liquid jet head (elements 12, 16, 28, 30, 32, and 33 in figs.1, 2), said liquid jet head being mounted at the first end of the tubular element (see fig.1 and 4) and connected to the electrical power source (18, fig.1) (see fig.1-4).

Regarding claim 21, Piatt et al as modified by Kokubo Masatoshi and Taneya et al as applied to claim 11 above further teaches a liquid jet head (elements 12,16,28,30,32,and 33 in figs.1, 2 of Piatt et al) comprising:

a substrate (38, fig.3 of Piatt et al) adapted to be mounted on a liquid ejecting instrument (14, 19, fig.1);

a liquid jet system (32,34,36,40, and 42, fig.3 of Piatt et al) positioned on the substrate (38), said liquid jet system (32,34,36,40, and 42) being adapted to eject liquid onto a medium from a distance (col.2, lines 10-33);

a control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) coupled to said liquid jet system (32,34,36,40, and 42, fig.3 of Piatt et al), to activate said liquid jet system for ejecting liquid onto the medium (col.2- col.3); and

measurement means (6, fig.1 of Kokubo Masatoshi) for acting, without physical contact with the medium (15), to measure the distance between the liquid jet head (30,fig.2 of Piatt et al) and the medium (15, fig.1 of Kokubo Masatoshi), said measurement means (6) being coupled to said control unit (16,fig.1 of Piatt et al), wherein said measurement means (6, fig.1 of Kokubo Masatoshi) is positioned on the substrate (38, fig.3 of Piatt et al); and

a movement detector means (fig.3 of Kokubo Masatoshi) positioned on said substrate (38, fig.3 of Piatt et al), said movement detector means (fig.3 of Kokubo Masatoshi) being adapted to detect movement of the liquid jet head (of Piatt et al), said movement detector means (fig.3 of Kokubo Masatoshi) being coupled to said control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) (see the abstract, fig.1-3 and the corresponding texts of Kokubo Masatoshi), wherein said measurement means (6, fig.1 of Kokubo Masatoshi) is positioned on the substrate (38, fig.3 of Piatt et al); and wherein said control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) is positioned on said substrate (38, fig.3 of Piatt et al) (see the rejection of claim 11 above).

Regarding claim 22, Piatt et al as modified by Kokubo Masatoshi and Taneya et al as applied to claim 11 above further teaches a liquid jet head (elements 12,16,28,30,32,and 33 in figs.1, 2 of Piatt et al) comprising:

a substrate (38, fig.3 of Piatt et al) adapted to be mounted on a liquid ejecting instrument (14, and 19, fig.1);

a liquid jet system (32,34,36,40, and 42, fig.3 of Piatt et al) positioned on the substrate (38), said liquid jet system (32,34,36,40, and 42) being adapted to eject liquid onto a medium from a distance (col.2, lines 10-33);

a control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) coupled to said liquid jet system (32,34,36,40, and 42, fig.3 of Piatt et al), to activate said liquid jet system for ejecting liquid onto the medium (col.2- col.3); and

measurement means (6, fig.1 of Kokubo Masatoshi) for acting, without physical contact with the medium (15), to measure the distance between the liquid jet head (of Piatt et al) and the medium (15, fig.1 of Kokubo Masatoshi), said measurement means (6) being coupled to said control unit (16,fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al), wherein said measurement means (6, fig.1 of Kokubo Masatoshi) further comprises an optical system (see paragraph 0034 of Kokubo Masatoshi) to measure the distance between said liquid jet head and the medium (15), and wherein said control unit (16, fig.1 of Piatt et al or CPU 26, fig.3 of Taneya et al) is positioned on said substrate (38, fig.3 of Piatt et al) (see the rejection of claim 11 above).

Response to Arguments

4. Applicant's arguments with respect to claims 11, 21, and 22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henok Legesse whose telephone number is (571) 270-1615. The examiner can normally be reached on Mon - FRI, 7:30-5:00, ALT.FRI EST.TIME.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

H.L.
12/10/2007

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